

# Study of Used Pruning Date Regulation Technique on the Retention and Production Cycle of Tea Trees in Eastern Taiwan

Hun-Yuan Cheng Horng-Jey Fan Shin-Yan Chen

The purpose of the experiment was trying to understand the suitable harvest date regulation technique of spring and inter tea. The experiment had proceeded at Lungteng of Luyeh district, in Taitung. The experimental treatments was included “great heat (23 July)”, “autumn begins (7 August)”, “stopping the heat (23 August, CK)”, “white dew (7 September)” and “autumnal equinox (23 September)”. TTES No.12 and Chin-Shin Oolong was pruning in the different solar terms. The result of the study showed that there was apparent different in harvest date due to pruning period. At the treatment waited until “autumnal equinox” to prune, the harvest crops will be in water, late winter, early spring and summer. Pruning in “autumn begins” and “autumnal equinox” had showed the same tendency in the period and had two more autumn tea and summer, while the next retention stage wouldn’t influenced. The tea trees still could growth at least two months. The yield of spring and winter crops were the higher in every treatment. The harvest date was regulated effectively. TTES No.12 used the model to regulate can harvest late winter crop and early spring crop at the same round. Pruning at “stopping the heat” and “white dew” can only harvest early crop. Chin-Shin Oolong can only harvest one early or late winter crop. But the strong vigorous tree can harvest both early spring and late winter crops. The comparison of the production value revealed that the treatment pruning at “autumn begins” tended to be higher at both varieties. Having early spring and late winter crop harvest date regulation model, the later early spring crop was pruned, the lower of the price. So the price of the tea in the same season would be different from pruning days. Tea trees pruned at “stopping the heat” or “white dew “were weaker after pruning. Maybe the production value of summer crop was lower or because the temperature was higher. The tea trees would wither easily that can’t harvest and with the result that would extend the next retention stage.

Key words : Tea tree, Harvest date regulation, Late winter tea , Early spring tea

## Effects of Different Pruning Depths on the Yield and Harvest Date in Retention Shoot of Summer Tea Season

Hun-Yuan Cheng Horng-Jey Fan

This experiment was conducted to understand effects of different pruning depths on the tea yield distribution, harvest date and manufactured tea quality among tea seasons in the different position plucking tea shoot of the same shoot. The experiment result of suitable pruning depths could refer to the tea field management in retention shoot of summer tea season. The experiment had proceeded from 1999 to 2002 at Lungteng of Luyeh district, in Taitung. The experiment varieties include TTES No 12 and Chin-Shin Oolong. The experiment treatments of different pruning depths included (A) green and younger shoots below branches, (B) yellowish green and lignified-slightly shoot, (C) intersects of reddish-brown and yellow-green shoots (D) reddishbrown and lignified shoot, (E) brown and lignified shoot (CK). The experiment results show that using

pruning the treatment of different depths to be shortened or extended plucking was not obvious, and very difficult to reach the purpose of harvest date regulation. The effects of yield regulation were larger than that harvest date regulation has. Change of shoot yield distribution among tea seasons in whole year was to as follows: Shoot yield of the A treatment was gradually increase trend among tea seasons. The yields of B and C treatments were smooth and steady among tea seasons. As the deeper pruning of D and E treatments in the initial stage, the tea shoot was ageing, coarse and short. Tea shoots of later stage below canopy that could not be pruned. The shoot yield had gradually decreasing. The A and B treatments were advantageous on the regulation yield distribution between spring and winter tea seasons.

Key words : Tea tree, Retention shoot, Pruning, Harvest date, Yield regulation

### Effect of Retention Stage and Pruning Position on the Shoot Growth and Yield of Tea Tree in Taitung

Hun-Yuan Cheng Horng-Jey Fan

This experiment was conducted in order to investigate a series reaction of summer retention time and pruning position in Taitung tea garden management system, the first report was investigated on autumn tea production. The experiment had proceeded in 2001 at Lungteng, Luyeh district, Taitung, with TTES No.12. The retention time were 90 and 165 days, the experiment treatments of different pruning depths included (A) green and younger shoots below branches, (B) yellowish green and lignified-slightly shoot, (C) intersects of reddish-brown and yellow-green shoots (D) reddish-brown and lignified shoot, (E) brown and lignified shoot (CK) respectively. The results of the experiment showed that 165 days summer retention stage had more new leaves and longer flush in autumn tea, so the plucking time was 4-5 days later than 90 days summer retention stage, but there were no significant differences among pruning depth treatments. Flush density and yield of 90 days summer retention stage were far higher than 165 days summer retention stage, but the result of 100 tea buds weight was conversely. The deeper the pruning, the higher the flush density and yield, but 100 tea buds weight decreased. In correlation analysis, flush density was an important factor on the yield, but the 100 tea buds weight had no significant effect.

Key words : Tea tree, Retention stage, Pruning position

### Application of Color Measurement Technology on the Measurement of Tea Bud Color

Horng-Jey Fan Hun-Yuan Cheng Ming-Shaiun Guu

The measurement value of chlorophyll meter (Soil-Plant Analyses Development unit, SPAD) would increase along with the number of tea shoots. The chlorophyll content has emerged first in the third leaf. The shoot color also would transform from yellowish green to heavy green. The standard sampling is one bud and three leaves, and the measured location is the lower left of the 3rd younger leaf when use colorimeter (color difference meter). The averages of L\* value, a\* value, and b\* value are  $32.78 \pm 1.99$ ,  $-9.38 \pm 0.79$ ,  $11.60 \pm 0.86$ , respectively. Corresponding measured

averages of chlorophyll a, Chlorophyll b, Chlorophyll are  $1.576 \pm 0.1996$  mg/g,  $0.45 \pm 0.14$  mg/g,  $2.15 \pm 0.34$  mg/g, respectively. The averages of carotene and SPAD chlorophyll absorption value are  $2.08 \pm 0.57$  and  $50.66 \pm 4.24$ , respectively. The best measured location is the lower left of the 3rd younger leaf (location of No.12) by the non-destructive determination of tea leaf and bud color with chlorophyll meter and colorimeter to use non-destructive determination of tea leaf color changes. in the best position to the left of the leaves on the lower third position (No. 12 position). The SPAD value and L\*, a\*, b\* values can basically reflect the chlorophyll content.

Key words : Tea tree, Tea leaf and bud color, Chlorophyll meter, Color difference meter

### Study on the Relation among Pigments and Manufacturing Process of Bai-hau Oolong Tea Chun-Liang Chen Kuo-Renn Chen

The objective of this research is to understand the change of the pigment content during the tea manufacturing process, so that may help us to judge the flavor quality and grade of the tea. Experimental results showed that the samples from the tea making competition did not show significant correlation between the pigment content and sensory evaluation grade. But the samples from the famous tea competition showed most significant correlation between the chlorophyll content and sensory evaluation grade. The chlorophyll content may become a good index to judge the flavor quality and grade of the Bai-hau Oolong tea.

Key words : Chin-shin Dapang, Sensory evaluation, Bai-hau Oolong tea, Pigment

### Variation of Flower Characters and Pollen Morphology in Accessions of *Camellia sinensis* (L.) O. Kuntze f. *formosensis* Kitamura

Bo-Ru Chen Chui-Feng Chiu Jin-Chih Lin Mau-Shing Yeh

In this study the characters of flower and pollen morphology of 11 accessions including 9 wild teas of *Camellia sinensis* (L.) O. Kuntze f. *formosensis* Kitamura and 2 cultivars were investigated to discuss the variation. The results are summarized as follows:

Characters of flowers: Pedicels are glabrous and length is 5 to 10 mm. Most of them have 5 sepals, 5 to 7 petals, 80 to 260 stamens, and 3-fid at apex of style. Their levels of style abruption are 1/2 to 1/6. Numbers of filament divided into 3 groups: above 200, 100~200, under 100. Ovaries are glabrous including Fong Huang wild tea, Mei Yuan wild tea, Chih Ya wild tea, Min Ghai wild tea, Nan Fong wild tea, Yung-Kang wild tea and TTES No.8. Ovaries are pilose including De Hua She wild tea, Long Tou wild tea, Le Ye wild tea and Chin-Shin-Oolong.

Pollen morphology: Pollen is divided into 2 types according their size. Pollen are medium (25~50  $\mu\text{m}$ ) including De Hua She wild tea, Fong Huang wild tea, Mei Yuan wild tea, Chih Ya wild tea, Long Tou wild tea, Min Ghai wild tea, Nan Fong wild tea, Chin-Shin-Oolong and TTES No.8.

Pollen are large (50~100  $\mu\text{m}$ ) including Le Ye wild tea. Polar view is semiangular including Fong Huang wild tea, Chih Ya wild tea and TTES No.8, and others are circular. Equatorial view of most of accessions are prolate spheroidal; however, Nan Fong wild tea is oblate spheroidal and Le

Ye wild tea is sub prolate. Exine sculpture of Nan Fong wild tea is verrucae, and others belong to fine reticulation. NPC classification, all pollen morphology is 343.

Key words : *Camellia sinensis* f. *formosensis*, Variation, Flower characters, Pollen morphology